JOURNAL OF PUBLIC HEALTH FOR TROPICAL AND COASTAL REGION (JPHTCR)

Journal homepage: http:/ejournal2.undip.ac.id/index.php/jphtr/index

ISSN : 2597-4378

Research Article

Relationship of Behavioral Factors with Existence of Aedes Aegypti in Buffer Area of Tanjung Intan Cilacap Port 2018

Akhmad Purnianto [a] , *Retno Hestiningsih* [b] , *Nissa Kusariana* [b]

[a]Student of Epidemiology and Tropical Disease, Faculty of Public Health, Diponegoro University.
Corresponding author. Email : cipung84@gmail.com
[b]Lecturer of Epidemiology and Tropical Diseases, Faculty of Public Health, Diponegoro University

Abstract

Background **:** DHF cases in the buffer area of Tanjung Intan Cilacap port is still high. Incident Rate (IR) reaches 0.54 per 1000 population. Density of DHF vectors is still abovethe required, HI 23.3%. The presence of Aedes aegypti larvae is influenced by several factors, one of which is behavior factor. This study aims to determine the relationship of behavior factors with the presence of larvae Ae. aegypti in buffer area of Tanjung Intan Cilacap Port.
Methods**:** This is an observational analytical study with cross sectional design. The sample was chosen multistage sampling with 385 houses. This research uses data collection method through observation and interview. The study was conducted from May to June 2018.
Results**:** The study yielded the following data. HI (28.1%), CI (26.13%), BI (37.9%). The chi-square analysis showed that variables related to the presence of larvae Ae. aegypti is Knowledge (p = 0,005), Attitude (p = 0,010) and Action (p = 0,039).
Conclusion**:** Increased knowledge is needed to support the success of mosquito nest eradication programs (PSN).

Keywords **:** DHF, Aedes aegypti mosquito larvae, behavior, landfill, port

Article History : *Received :15-01-2019 ; Revised : 14-02-2019; Accepted: 5-04-2019*

Background

DHF is one of the PHEIC (Public Health Emergency of International Concern), which is a public health emergency that can disturb the world because it can spread across countries through ports, airports and land boundaries. Therefore the port as one of the country's entrances must be free from insect / disease transmission vectors including *Aedes aegypti* mosquitoes. The buffer zone is required by House Index (HI) not more than 1%. This aims to prevent, protect and control the spread of vector borne diseases in the port area, considering the port is a gathering place for people, goods and

means of transport that could potentially bring the source of disease transmission both domestic and foreign. [1,2]

Based on Port Health Information System (SIMKESPEL) Cilacap Class II Port Health Office in 2017 , density of Aedes aegypti larvae in the buffer area still very high. HI (House Index) reaches 23.3%. [3] This condition is a risk factor for dengue disease transmission both in its own port area and transmitted abroad carried along with international transport equipment. [4] DHF cases in the buffer zone of Tanjung Intan Port in Cilacap are still high. Data for 2017 shows Incidence Rate (IR) of DHF at 0.54 per 1,000 population. Even though there were no mortality due to dengue cases, incidence cases always occur every year. [3]

The Port Health Office of Cilacap class II has made various efforts to control the Aedes aegypti mosquito vector. These efforts are routine surveys, mosquito nest eradication programs, abatization, 'jumantik' program and control measures in the form of fogging and public awareness programs with dissemination of information media in the form of leaflets. But these efforts had not effective. [3,4,5]

Behavioral factors are important factors in efforts to control dengue. DHF control is most effectively carried out with mosquito nest eradication programs which drain, close and recycle used goods, and control with larvicidation, maintain larvae and prevent contact with mosquitoes. This programneeds of community participation. Because of the presence of DHF vectors spread throughout the community. [6]

Dengue Hemorraghic Fever Transmision

Female Aedes aegypti mosquitoes are infected with dengue virus while sucking the blood of DHF patients who are in the stage of viremia. This stage of viremia is between 2 days before 5 days after the onset of fever. Extrinsic incubation period in mosquito bodies occurs after 8-12 days. After this incubation period, mosquitoes will become infective throughout their lives.

Viral infections will reach the mosquito salivary glands and will come along with mosquito saliva fluids through bite wounds and spread to other people. Symptoms will appear after the incubation period is over, which is between 3 to 4 days (average 4-6 days). Initial symptoms occur suddenly, characterized by fever, dizziness, muscle aches (myalgia), loss of appetite and several other symptoms. [7]

Life Cycle of *Aedes aegypti* mosquito

Aedes aegypti mosquitoes are included in holometabola, which has

complete metamorphosis. The stage of change in metamorphosis is egg-larvae-puppets - adults. Pre-adult stage (eggs, larvae and pupae) live in water. In general, after 2-4 days, the eggs will be hatched into larva. Wiggings take to 6 days to change from instar 1 to instar 4 and then will hatch into pupa. Incense will hatch into adult mosquitoes after 2-4 days. The time needed for the process of growth from eggs to adult mosquitoes ranges from 9-10 days. Female mosquitoes can live for 2-3 months. [8]

Breeding Habitat

Potential breeding places for Aedes sp. are places that can accommodate clean water both inside, outside or around the house and public places. In general, the grouping of *Aedes aegypti* mosquito breeding habitats are : [6,9]

a. Storage of water for daily needs, such as: bathtubs, drums, jars, buckets and storage tanks.
b. Water storage is not for daily use, such as: flower vases, bird drinking containers, ant traps, control tubs, dispensers, refrigerators, and used items such as cans, bottles, plastic, tires, etc.).
c. Natural water reservoirs such as: bamboo pieces, tree holes, stone holes, coconut shells, leaf midribs, bamboo pieces, banana leaves and brown / rubber skin, etc.

Behavior

According to the "Preced-Procedure" theory that was developed by Lawrence Green, the main factors that affect a person's health or society are influenced by non-behavioral factors and behavioral factors. Behavioral factors are determined by 3 main factors, namely predisposing factors, enabling factors, and reinforcing factors. Behavior as a result of the relationship between various psychiatric symptoms (attention, mind, memory, observation, fantasy, etc.) that influence each other and appear together. There are three domains of behavior, namely cognitive, affective and psychomotor, which in the development of this domain is measured by the level of knowledge, attitude and action. [10]

1. Knowledge

Knowledge as a result of human sensing is the result of one's knowing an object, through its five senses (eyes, ears, nose, etc.), most of which are obtained from the senses of hearing and sight. From this sensing it will automatically produce knowledge. Intensity and perception of objects greatly affect the level of knowledge. Broadly speaking there are 6 levels of knowledge as a result of sensing, namely: Know, Understand

(Comprehension), Application, Analysis , Synthesis and Evaluation. [10]

2. Attitude

Attitude is a closed response and is a collection of symptoms (syndrome) someone against an object or stimulus that involves the opinions and emotions in question. The form of attitude is agree-disagree, happy-not happy, good-bad and so on. Attitudes involve feelings, thoughts, attention and other mental symptoms. Attitudes also have levels based on their intensity, namely: receiving, responding, valuing, and responsible. [10]

3. Practice

The realization of actions is influenced by attitudes, availability of facilities and other support. According to the quality, practice or action can be divided into 3 levels, namely: guided response, mechanism and adoption. Thus giving rise to motivation, intention to take action, and ultimately the realization of intention to become a behavior. [10]

Methods

This type of research is an observational analytic study using a cross-sectional design to determine the relationship of behavioral factors with the presence of Aedes aegypti mosquito larvae in the buffer zone of Tanjung Intan Port, Cilacap in 2018. The population in this study were all houses in the buffer zone of Tanjung Intan Port, Cilacap. [3] Samples were taken purposively with the number of 385 houses. Data were analyzed by univariate and bivariate. Bivariate analysis was performed by connecting the independent variables with the dependent variable using the SPSS program with the chi square test.

The independent variable in this study is the knowledge, attitude and action to eradicate mosquito nests in the community of the Buffer Port of Tanjung Intan Port, Cilacap. The dependent variable is the presence of Aedes aegypti mosquito larvae in the Buffer area of Tanjung Intan Port, Cilacap. Primary data in this study were obtained from the results of interviews with respondents and direct observation of water reservoirs inside the house and outside the respondent's house by using questionnaires and observation sheets.

Knowledge measurement is done by interview method using a questionnaire. Respondents' answers rated a score of 1 if correct and rated 0 if wrong. The total score ≤ 75% is categorized as bad knowledge and if> 75% then the category of knowledge is good. [11.12] Attitude measurement is done by interview method using a questionnaire.

Respondents' answers were strongly disagree, disagree, agree and strongly agree, with scores of 1, 2, 3, and 4 respectively. The total score ≤ 75% is categorized as bad knowledge and if> 75% then the category of knowledge is good. (11.12). Measurements of actions carried out by interview method using a questionnaire. Respondent answers score 1 if correct and rated 0 if wrong. The total score ≤ 75% is categorized as bad knowledge and if> 75% then the category of knowledge is good. (11.12)

Table 1. Responden Distribution based on knowledge, attitude, and action to eradicate Aedes aegypti mosquito nests

Variable	Category	Number	
		n	(%)
Knowledge	Good	85	22,1
	Bad	300	77,9
Attitude	Good	192	49,9
	Bad	193	50,1
Action	Good	290	75,3
	Bad	95	24,7
Existence of Aedes aegypti larvae in the hous	Presence	108	28,1
	Not presence	277	71,9

The analysis was carried out in univariate and bivariate. Univariate analysis is presented in the form of frequency distribution tables. Bivariate analysis is presented in cross tabulation. Bivariate analysis was carried out to measure the relationship between independent variables and dependent variables. The analysis carried out is the chi square test using a computer program.

The significance criteria used are if the value of p <0.05, there is a relationship between knowledge, attitudes and actions of the eradicate of Aedes aegypti mosquito nests in the Buffer area of Tanjung Intan Port, Cilacap in this study also calculated Prevalence Ratio (PR) with a Confident Interval of 95%.

Results

Univariat Analysis

The variables in this study consisted of knowledge, attitudes, actions to eradicate the nest of dengue mosquitoes, and the presence of larvae in the respondent's house. The more complete research results can be seen in table 1.

Description of Knowledge, Attitude, and Action in Buffer area in the Buffer area of Tanjung Intan Port, Cilacap.

Based on table 1, most of the respondents have lack of knowlodge about PSN-DHF. Many respondents did not know the complete symptoms of DHF. Respondents did not support prevention and control of DHF with 3M implementation. The category of PSN-DHF action in the respondents still good , but there are barriers to implement larvidation's program.

carried out using the chi square test. The strength of the relationship is measured by the value of the Prevalent Ratio (PR). The results of statistical analysis show that the p value on the variables of knowledge, attitude and action are <0.05. This results show that there is relationship between knowledge, attitudes, and actions with the existence of Ae larvae. aegypti in the Buffer area of Tanjung Intan Port, Cilacap. The strength of the relationship can be known by PR value. The PR value of all items > 1, so that knowledge, attitudes and actions have a bad influence for the existence of Ae larvae. aegypti in the Buffer area of Tanjung Intan Port, Cilacap.

	Presence of larvae				Number		P value	PR (CI 95%)
	presence		Not presence					
	n	%	n	%	n	%		
Knowledge								
Bad	95	31,7%	205	68,3%	300	100%	0,005	2,567 (1,355-4,86)
Good	13	15,3%	72	84,7%	85	100%		
Attitude								
Bad	66	34,2%	127	65,8%	193	100%	0,01	1,856 (1,179-2,921)
Good	42	21,9%	150	78,1%	192	100%		
Action								
Bad	35	36,8%	60	63,2%	95	100%	0,039	1,734 (1,058-2,842)
Good	73	25,2%	217	74,8%	290	100%		

Ae. aegypti in the Buffer area of Tanjung Intan Port, Cilacap

Based on table 1, Ae. Aegypti were founded in 28% of respondents' houses especially in several containers in the house. The larvae showed a density of HI (House Index) of 28%.

Analisis Bivariat

Bivariate analysis was conducted to determine the relationship between two variables, namely the independent variable and the dependent variable. The test was

Discussion

Respondent's actions related to PSN-DHF are mostly good but not supported by good knowledge. This condition makes the PSN-DHF target action not appropriate. Most of the respondents did not know that the pool of overflowing water from refrigerators, plant pots, bird drinking

places and overflowing water reservoirs was the breeding ground for Ae mosquitoes. aegypti. The results of observations indicate that all types of these larvae are found in the presence of Ae . aegypti larvae. This condition makes Ae . aegypti larvae density is high. Larvae in container will turn into a mosquito and will continue to multiply. Because of the habit of Ae . aegypti mosquitoes that lay eggs on several different containers, so that they can spread to several locations. This is a risk factor for high density of Ae . aegypti larvae in the buffer zone of Tanjung Intan Port, Cilacap.

Most of respondents did not know the full symptoms of DHF. They did not know that weakness, nausea, muscle aches, nose bleeding and heartburn were symptoms of DHF. Though some of these symptoms appear at the stage of viremia. Stage of viremia is the most critical period of transmission because the patient has been infective to transmit to others through an intermediary vector, but Ae . aegypti mosquito not showing severe symptoms. [7] High density of Ae. Aegypti mosquitoes is a risk of wider transmission.

More of Ae. Aegypti larvae were found in respondent's house that have bad knowledge. Statistical analysis show that respondents with bad knowledge have a 2.567 times chance of being found for Ae. aegypti larvae in his house. This results shows that knowledge has a major role in the existence of Ae . aegypti larvae.

Knowledge is very important to support 3M Plus- PSN program which demands active and independent community participation. 3M PSN Plus action must be done in places that are indeed a breeding place of Ae. aegypti. Good knowledge will provide encouragement for good action too.

The results of this study are in line with research conducted by Nani (2016), which shows that there is a statistically significant relationship between knowledge with the existence of Ae . aegypti larvae at Pulang Pisau Harbor KKP Class III Palangkaraya with p value = 0.004. [13] Research conducted by Gafur and Jastam MS (2015) also got the same results. There is a relationship between the knowledge of PSN and the existence of Ae . aegypti larvaewith p value = 0.003. [14]. It is important to improve the knowledge of the community about PSN-DHF by socializing, counseling and disseminating information. A good PSN action is expected to reduce the density of Ae . aegypti larvae which is below 1%.

Knowledge is closely related to attitude as a closed response which is a person's symptoms against an object or stimulus that involves opinions and

emotions. An increasingly positive attitude will move someone to act better. The better attitude in the PSN-DHF can lead to a better action.

The results showed that Ae.aegypti larvae more found in respondents with bad attitude than respondents with good attitude. Statistical analysis show that respondents who have a bad attitude have a chance of 1.865 times greater for the presence of Ae. aegypti larvae in his house. This attitude shows a person's response and acceptance to a stimulus, in this case the response and acceptance of the Tanjung Intan Cilacap Port buffer community towards the implementation of the PSN-DHF. This attitude involves the opinions and emotions of someone who ultimately will provide motivation to do or not do something to respond a stimulus. Many people's attitudes about the existence of Ae. aegypti larvae is not positive. This makes the attitude a risk factor for the density of Ae . aegypti larvae. in the buffer zone of Tanjung Intan Port, Cilacap.

The results of this study are in line with research conducted by Nani (2016) which shows that there is a statistically significant relationship between attitudes with the existence of Ae . aegypti larvae at Pulang Pisau Harbor Class III Palangkaraya KKP with p value = 0.024. [13] Research conducted by Arif Budiman (2016) also shows the same result, there is a significant relationship between the attitude of PSN-DHF with the presence of Ae . aegypti larvae in Nanggulan District, Kulon Progo Regency with p value = 0.009. [15]

Based on the description , it is necessary to develop an attitude by giving a deeper understanding until a level of responsible attitude is achieved. So that it can trigger the better intention to do PSN-DHF and the density of Ae . Aegypti larvae in the buffer area can decrease.

Action is a real action taken by someone in response to a stimulant. This action consists of 3 levels, namely mechanism and adoption. A person's behavior happen with the beginning of the knowledge, motivation arises, intention to do an action and becomes a behavior.

The results showed that Ae.aegypti larvae more found in respondents with bad action than good action. Statistical analysis show that respondents with bad actions have an opportunity of 1,734 times to find Ae.aegypti larvae in his house. PSN's actions as an effort to reduce the presence of DHF vector are preferred programs in preventing dengue transmission. Because drugs and vaccines have not been found to prevent transmission. So that, the breaking of the transmission chain still uses vector control methods. The effectiveness of DHF vector control with 3M plus PSN requires

broad, simultaneous and continuous involvement of the community. Implementation of the PSN should be done comprehensive.

The results of this study are in line with the research conducted by Nani (2016), that have significant relationship between the PSN Actions and the existence of Ae . larvae aegypti at Pulang Pisau Harbor Palangkaraya Class III KKP with p value = 0.000. [16]

Improvement of the health promotion program and increase public awareness was needed in the Buffer Port of Tanjung Intan Port, Cilacap, to carry out PSN actions properly. Involvement of community leaders and local government must be supported to realize community PSN-DHF actions.

Conclusion

There is relationship between knowledge and presence of Ae. aegypti larva in Buffer area at Tanjung Intan Cilacap Harbor with p value 0,005. There is also relationship between action with presence of Ae. Aegypti larvae in Buffer area at Tanjung Intan Cilacap Harbor with p value 0,039. Improvement of knowledge about DHF symptoms and potential place that can be a breeding ground for Aedes aegypti mosquitoes must be done.

Acknowledgment

Thank you for BPPSDM Ministry of Health as the funder in Master studies and Cilacap Port Health Office Class II as the research location.

Refferences

1. Ministry of Health. Law Number 1 year 1962 on Sea Quarantine
2. World Health Organization. International Health Regulations - Third Edition. Third. WHO. France: WHO; 2016.
3. Health Office of Cilacap Port Class II. Health Information System of Cilacap Port Report. 2017.
4. Ditjen PP & PL. Standar Operasional Prosedur Nasional Kegiatan Kantor Kesehatan Pelabuhan di Pintu Masuk Negara. Jakarta: Ditjen PP & PL Kemenkes RI; 2010.
5. KKP Kelas II Cilacap. Laporan Tahunan KKP Kelas II Cilacap Tahun 2015. 2015.
6. Kementerian Kesehatan. Modul Pengendalian Demam Berdarah Dengue. Kementerian Kesehatan. Jakarta: Ditjen PP & PL Kemenkes RI; 2011.
7. World Health Organization. Dengue: guidelines for diagnosis, treatment, prevention, and control. WHO. France: WHO; 2009.
8. Frida. Mengenal Demam Berdarah Dengue. Jakarta: Pamularsih; 2008.
9. Hermayudi, Ariani AP. Penyakit Daerah Tropis. Yogyakarta: Nuha Medika; 2017.
10. Notoatmodjo S. Ilmu Perilaku Kesehatan. Rineka Cipta; 2010.

11. Notoatmodjo S. Metodologi Penelitian Kesehatan. Jakarta: Rineka Cipta; 2012.

12. Nursalam. Konsep dan Penerapan Metodologi Penelitian Ilmu Keperawatan. Jakarta: Penerbit Universitas Indonesia; 2008.

13. Nani. Hubungan Perilaku Psn Dengan Keberadaan Jentik Aedes Aegypti Di Pelabuhan Pulang Pisau. J Berk Epidemiol. 2017;5(April 2017):1–12.

14. Gafur A, Jastam MS. Faktor yang Berhubungan dengan Keberadaan Jentik Nyamuk Aedes aegypti di Kelurahan Batua Kota Makassar Tahun 2015. Al-Sihah Public Health Sci J. 2015;VI(2):50–62.

15. Silver, J.B., 2008, Mosquito Ecology Field Sampling Methods Third Edition, Netherland, Springer

16. Maulidyah N, Jafriati, Ardiyansyah RT. Gambaran Perilaku Masyarakat Terhadap Keberadaan Jentik Nyamuk Aedes Aegypti Di Kelurahan Tobuuha Kecamatan Puuwatu Kota Kendari Tahun 2016. J Ilm Mhs Kesehat Masy. 2017;2(6):1–8.